STUDY OF SPECIFIC BIOPOLYMERS FOR PRODUCTION OF PROBIOTIC MICROCAPSULES BY COMPLEX COACERVATION

Rodrigues, L.Z. [1], Silva, T.M. [1], Nunes, G.L. [1], Holkem, A.T. [1], Codevilla, C.F.[1], Grosso, C.R.C [2], Silva, C.B[1], Menezes C.R [1]

[1]UFSM – Universidade Federal de Santa Maria (Avenida Roraima 1000, Camobi,97105-900, Santa Maria – RS)
[2]UNICAMP- Universidade Estadual de Campinas (Cidade Universitária Zeferino Vaz - Barão Geraldo, 13083-970, Campinas - SP)

For storage and maintenance of the probiotics viability there are several forms to protect a living organism and the microencapsulation is one of the most viable alternatives to this process which involves wrapping the organisms body into a capsule resulting in its protection. The complex coacervation is one of the various forms of encapsulation and is based on the formation of an insoluble complex of two oppositely charged biopolymers by changing the environmental conditions (pH, ionic strength, temperature), which allows the complex's deposition around the active forming a film responsible for its retention, protection and release. The zeta potential measures the repulsion or attraction of electrostatic charges between particles and is one of the main parameters that affect the particle's stability. Thus, the pH is an essential factor for the formation of the capsules and directly influences the behavior of the loads. In this sense, the objective of this study was to evaluate the behavior of biopolymers loads through zeta potential and define the best hydrogenionic potential condition (pH) for the encapsulation of *B. lactis* by complex coacervation. To do this, five samples of biopolymers were prepared, gelatin 2.5% and 2.5% gum arabic, in the ratio 1:1 and pH adjusted from 3.0, 4.0, 5.0, 6.0 e 7.0, and then held zeta potential reading equipment Zeta Sizer. For encapsulation was added to 1 g of *B. lactis,* 100 ml of 2.5% gelatin, kept under stirring and heating (48-50ºC / 10 min). Then, 100 mL of 2.5% gum arabic and 400 ml of distilled sterile water were added adjusting the pH to 4.0 for the formation of microcapsules. After, the heating was switched off to leave cool naturally until 30°C to finally force lowering the temperature with ice (12-10ºC) and left to sediment. For counting, the microcapsules were homogenized with a 7.5 pH sodium phosphate buffer at a refrigerated incubator "shaker" (180 min, 37°C , 150 rpm). Then, decimal serial dilutions were performed. From each dilution, 1 ml was inoculated in MRS agar and incubated at 37 C in anaerobiosis medium for 72 h. According to the zeta potential it was observed that the 4.0 pH is most suitable for encapsulation by the presenting loads closer to neutrality (2.27 ± 0.06) which gives the complexation of biopolymers and hence the formation of microcapsules. After encapsulation the feasibility was 14.54 $CFU.g^{-1}$ to log *B. lacti*. Therefore, the zeta potential is a suitable method for assessing loads biopolymers used in encapsulation by complex coacervation, providing the formation of the microcapsules and thus maintaining the viability of the microorganism.

Keywords: zeta potential, *Bifidobacterium lactis* , microencapsulation

Sponsoring agency : PROBIC , CNPq